AI BASED TOOL TO ASSIST VEHICLES IN DETECTING OBJECTS TO AVOID ACCIDENTS.

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TABLE OF CONTEXTS

CONTEXT

- In India every year nearly 4 to 5 lakh accidents happen .in those accidents almost 2 to 3 lakh people die.
- Many of these accidents happen due to reasons like obstacles on the road and low visibility during night.
- These minute human errors are making such huge losses to the society.


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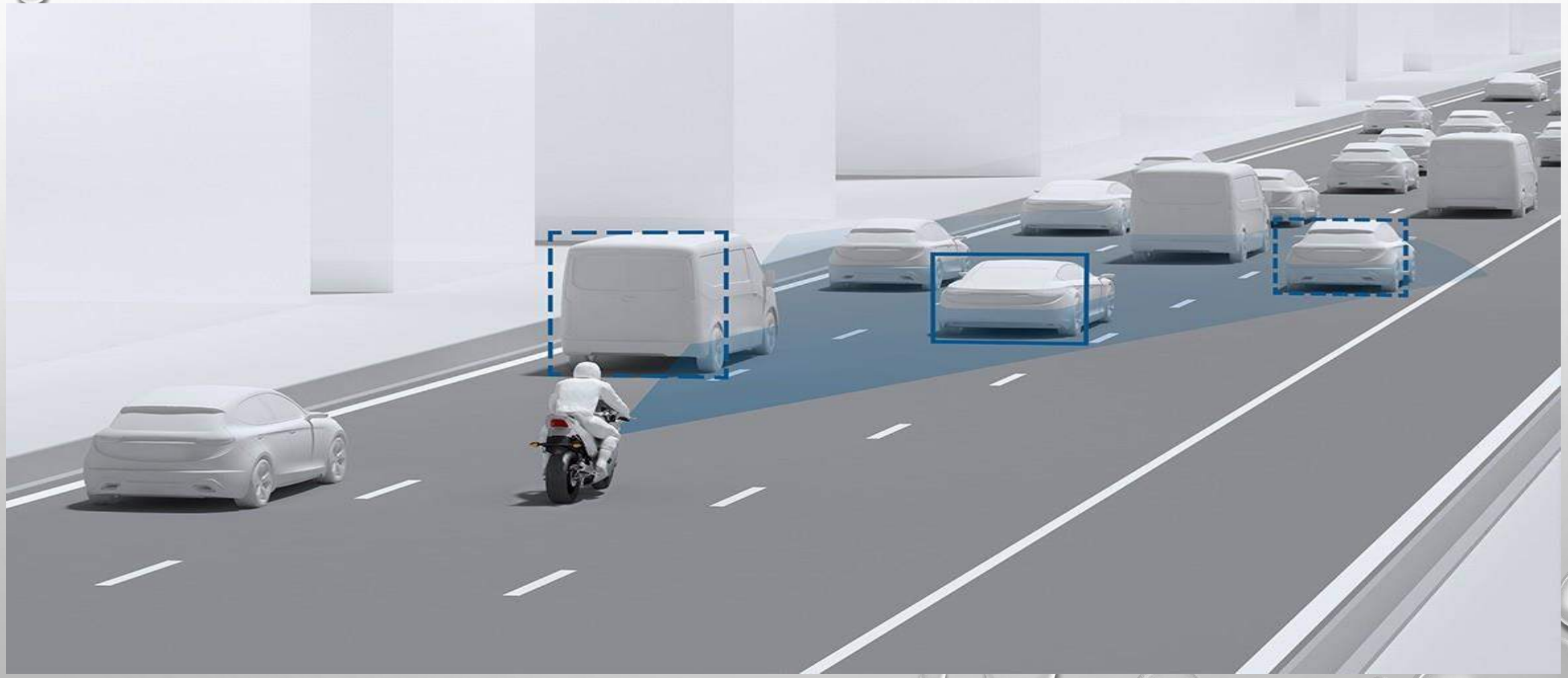
AI BASED TOOL TO ASSIST VEHICLES IN DETECTING OBJECTS TO AVOID ACCIDENTS



PROBLEM STATEMENT

- ON A SURVEY ABOUT TWO WHEELER ROAD ACCIDENTS , WE CAME TO KNOW THAT UPTO 60% OF ACCIDENTS HAPPEN AT NIGHT TIME.
- MOST OF THESE ACCIDENTS AR LEAD BY PITS ,SAND, ROCKS AND OTHER OBSTACLES ON THE ROAD.
- DUE TO LOW VISIBILITY AT NIGHT TIME THESE OBSTACLES CAN'T BE SPOTTED BY THE RIDER.
- TO OVERCOME THE ABOVE SCENARIOS THERE IS NO EXISTING TECHNOLOGY .
- SO WE WANTED TO EXPLORE THIS PROBLEM THROUGH OBJECT DETECTION.

ABSTRACT :

- THE MAIN PURPOSE OF THIS PROJECT IS TO BUILD A OBJECT DETECTOR IN VEHICLES TO DETECT THE OBSTACLES(SUCH AS SAND PILES ,PITS AND ROCKS)
  - WE WANT TO INDICATE THE OBSTACLES BY DISPLAYING OBSTACLES ON SPEED DISPLAY METER
  - TO CONVEY THE DETAILS OF DETECTED OBJECT IN FORM OF TEXT MESSAGE ALONG WITH A VOICE COMMAND.

Literature Review:

S.NO	Author	Journal	Algorithm	Accuracy	Scope
1	Zhongmin Liu Zhicai Chen Zhanming Li Wenjin Hu	An Efficient Pedestrian Detection Method Based on YOLOv2	YOLOv2, Y-PD, Faster R-CNN,Yolo v3, Non-maximum suppression algorithm	90.9%	Because of the diversity of size, resolution and so on, there is still a big gap between our model and the state-of-art pedestrian methods. So future task will mainly work on designing of the better model of the Caltech dataset for pedestrians.
2	Shrinath Oza,Dr. Sunil Rathod Journal:International Journal of Engineering Research & Technology (IJERT)	International Journal of Engineering Research & Technology (IJERT)	Haar Cascade algorithm Viola jones algorithm YOLO Algorithm DCNN Algorithm CNN Algorithm	80%	The main purpose of the system is to implement the real-time objects detection system on a Raspberry Pi to avoid accidents and improving road safety.
3	Javed and Shah	Object tracking method:- Point Tracking Kalman Filter	kalman	Moderate	This approach applicable to track point even in noisy images Distributed State variables

Motorcyclist dies after falling into pit dug up on road

SPECIAL CORRESPONDENT

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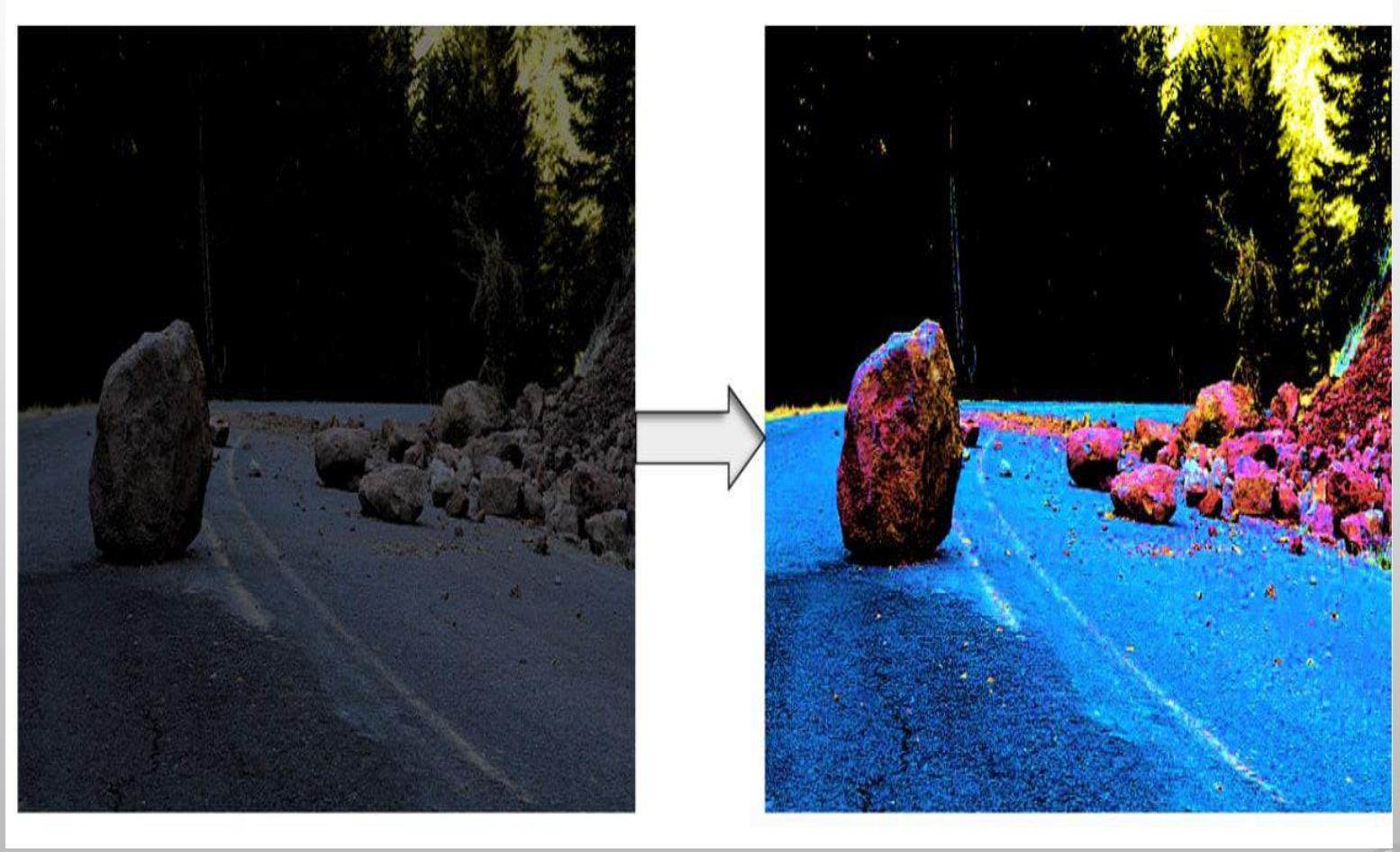
OUR APPROACH TO THE PROJECT

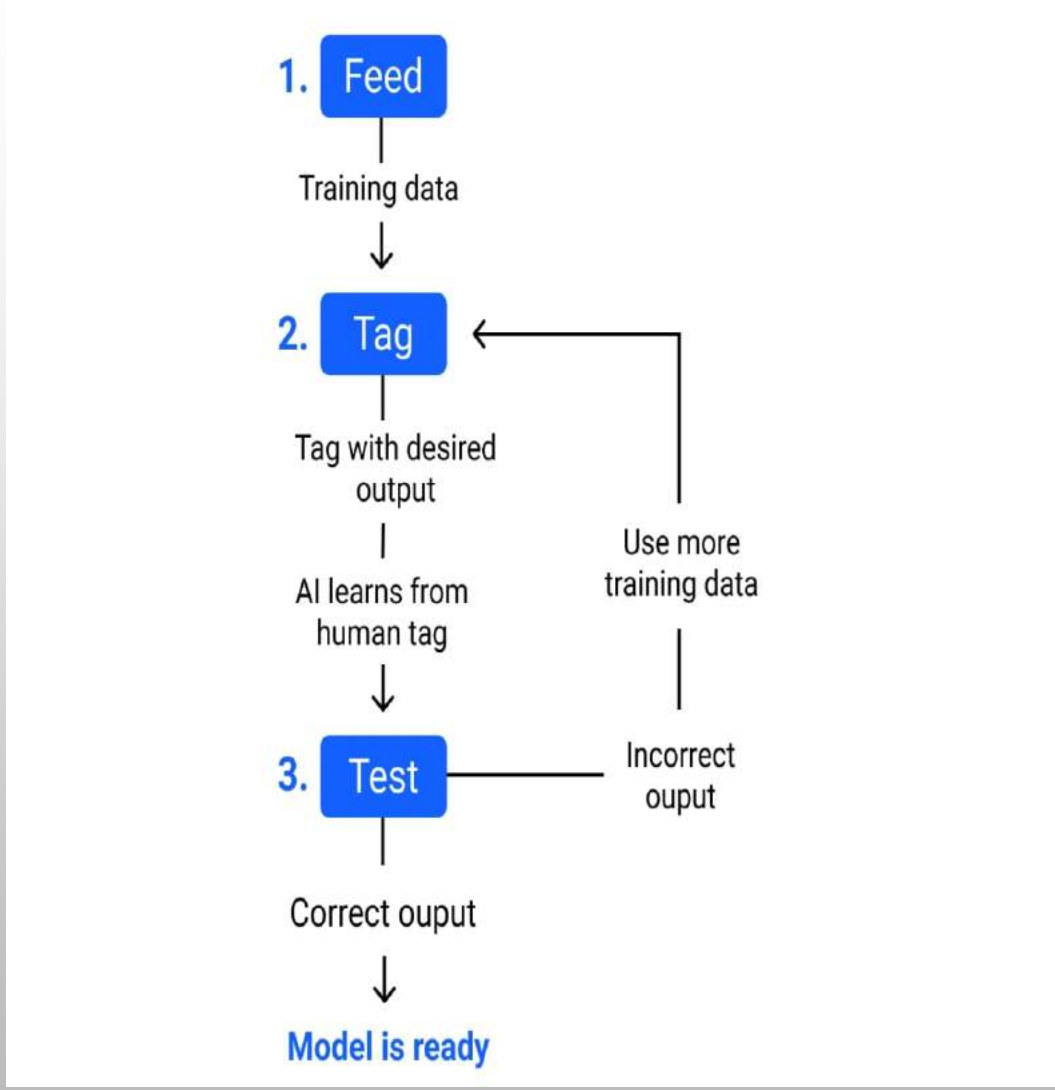
STEP 1-INPUT

- THE INPUT IS CAPTIVATED FROM A CAMERA FIXED TO THE BIKE HEADLIGHT.
- THE CAMERA USED WILL BE A 4K RESOLUTION WIDE ANGLED CAMERA FOR BETTER RESULTS.

STEP 2- IMAGE ENHANCEMENT



- THE IMAGE WILL BE RECEIVED BY THE ARDUINO ATTACHED TO THE CAMERA.
- AS THE PICTURES ARE TAKEN AT NIGHT TIME, TO ENHANCE THE CLARITY SOME CHANGES ARE MADE . (*INCREASING BRIGHTNESS , CONTRAST, ADJUSTING SATURATION*)
- FOR THIS ENHANCEMENT WE WILL BE USING RETINEX ALGORITHM.



STEP 3-DATASET TRAINING

HERE WE WILL BE TRAINING OUR SOFTWARE BY PROVIDING PROPER DATASETS.

1. FEED- TO INPUT DATA FOR TRAINING A MACHINE LEARNING MODEL .

2. TAG- NAME THE TRAINING DATA WITH A DESIRED OUTPUT. THE MODEL TRANSFORMS THE TRAINING DATA INTO TEXT AND VECTORS – NUMBERS THAT REPRESENT DATA FEATURES.

3. TEST-TEST THE MODEL USING NEW INPUTS .IF IT GIVES CORRECT OUTPUT THE MODEL IS READY. IF NOT TRAIN THE MODEL WITH FEW MORE DATASETS.

IMAGES OF FEW DATASETS

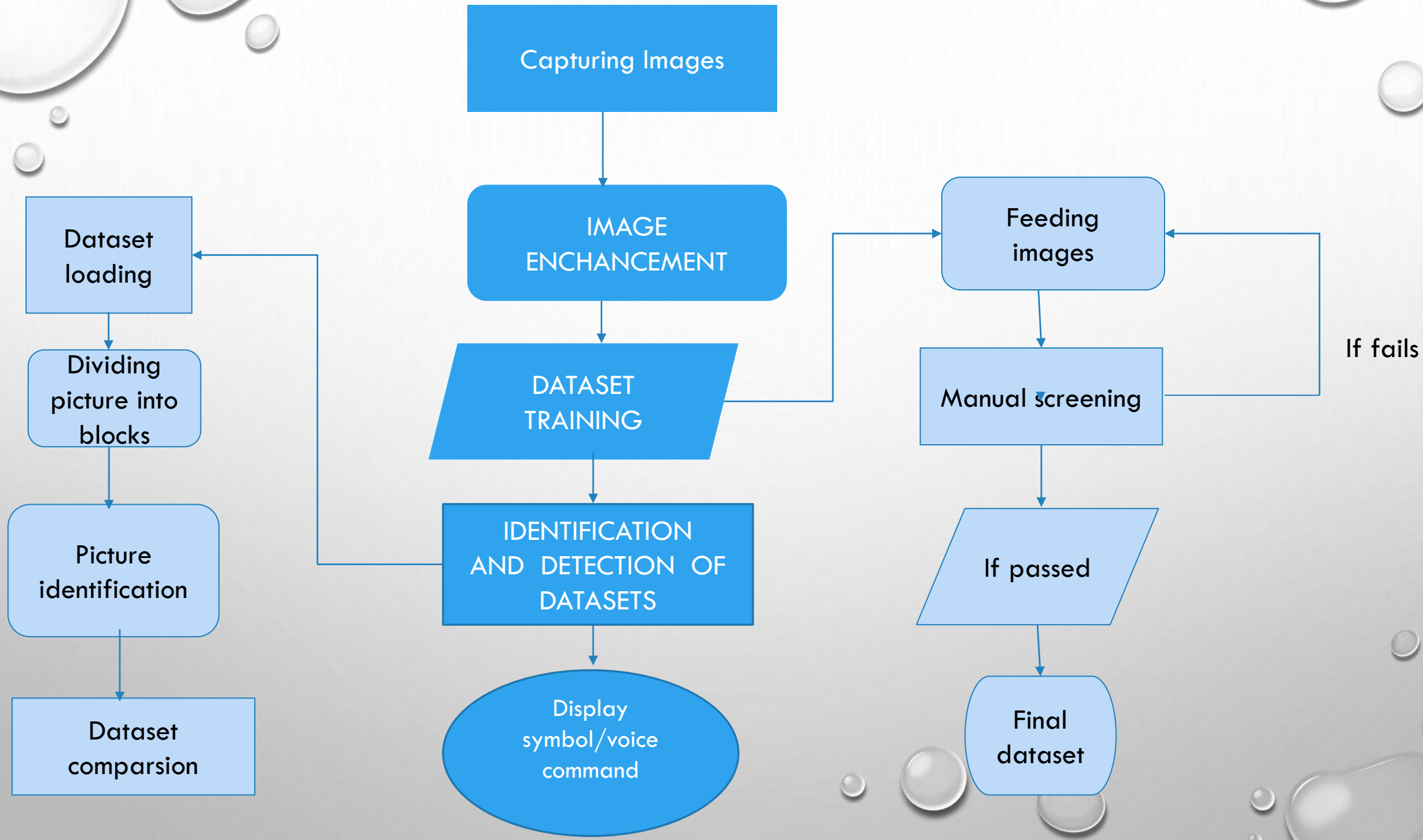
STEP-4 IDENTIFICATION AND DETECTION

- THE PROCESSED IMAGE WILL BE IDENTIFIED ACCORDING TO ITS DATASET (SAND, ROCKS AND PITS).
- FOR IMAGE IDENTIFICATION AND DETECTION WE WILL BE USING YOLOV3 ALGORITHM.
- WE WILL BE USING OPENCV , KERAS AND TENSORFLOW LIBRARIES FOR THIS STEP.
- AS THE IMAGE IS IDENTIFIED THE INSTRUCTION WILL BE GIVEN TO PROCEED WITH THE OUTPUT .

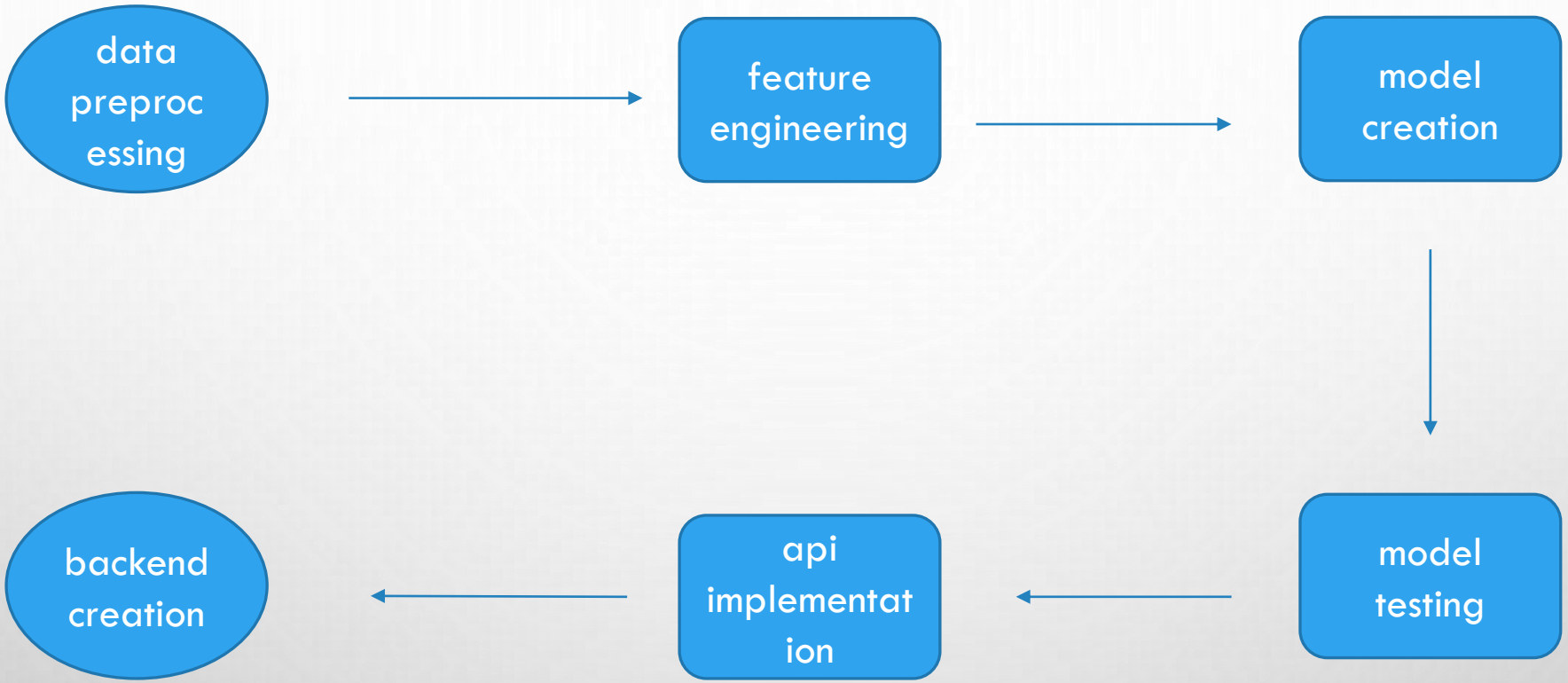
STEP-5 OUTPUT

- THE OUTPUT WILL BE IN THE FORM OF PICTURE AND AN VOICE COMMAND.
- THE PICTURE WILL BE DISPLAYED ON THE DIGITAL SPEEDOMETER.
- THE VOICE COMMAND WILL BE PASSED ON TO THE RIDER'S HELMET VIA BLUETOOTH.

FLOWCHART OF OBJECT DETECTION


Capturing Images
IMAGE ENCHANCEMENT
DATASET TRAINING
IDENTIFICATION AND DETECTION OF DATASETS
Display symbol/voice command
Dataset loading
Dividing picture into blocks
Picture identification
Dataset comparsion
Feeding images
Manual screening
If fails
If passed
Final dataset

PROCEDURE


data preproc essing
feature engineering
model creation
model testing
api implementat ion
backend creation

CONCLUSION

BY CHOOSING THIS TOPIC, WE HAVE AIMED TO PRODUCE OPTIMIZED SOLUTION FOR THE OBSTACLES THAT HAVE COME UP IN THE EXPERIMENTS WE HAVE SEEN TILL DATE.

- OUR PRODUCT WILL BE USEFUL IN ROAD CONDITION MONITORING AND PREVENT ACCIDENTS DURING NIGHT TIME .
- OUR ATTEMPT HERE IS TO TRY TO DEVELOP A BETTER SOLUTION FOR OBJECT DETECTION IN VEHICLES .
- IN ADDITION TO THAT WE ARE ALSO ATTEMPTING TO CONVEY THE INFO OF DETECTED OBJECTS TO THE RIDER IN AN EFFICIENT MANNER.


Thank You!